RESTRICTED

SERIAL NO. 4459

INSTRUCTION BOOK

for

TYPE COA-66089

EXTERNAL ANTENNA SYSTEM

Operating Frequency: 72.5 MC ± 1 MC

Manufactured for

U. S. Navy Department Bureau of Ships

by

ABBOTT INSTRUMENT, INC.

NEW YORK, N. Y.

Contract: NXss-27168
or NXsr-33385

Date: April 22, 1943
or June 29, 1943

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INSTRUCTION BOOK

FOR

TYPE COA-66089 EXTERNAL ANTENNA SYSTEM

Operating Frequency: 72.5 MC ± 1 MC

This instruction book is furnished for the information of commissioned, warrant, enlisted and civilian personnel of the Navy whose duties involve design, instruction, operation and installation of radio and sound equipment. The word *"RESTRICTED"* as applied to this instruction book signifies that this instruction book is to be read only by the above personnel, and that the contents of it should not be made known to persons not connected with the Navy.

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ABBOTT INSTRUMENT, INC.
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DATE: April 22, 1943
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GUARANTEE

One year service, replacement, on failure reports.

The equipment, including all parts and spare parts, except vacuum tubes, storage batteries, rubber and material normally consumed in operation, is guaranteed for a period of *ONE YEAR* with the understanding that, as a condition of this contract, all items found to be defective as to design, material, workmanship or manufacture will be replaced without delay and at no expense to the government, provided that such guarantee and agreement will not obligate the contractor to make replacement of defective material unless the failure, exclusive of normal expected shelf life deterioration, occurs within a period of *ONE YEAR* from the date of delivery of the equipment to and acceptance by the Government, and provided further that if any part or parts *(except vacuum tubes)* fail or are found defective to the extent of ten per cent *(10%)* or more, but not less than two, of the total number of similar units furnished under the contract *(exclusive of spares)*, such part or parts, whether supplied in the equipment or as spares, will be conclusively presumed to be of defective design, and as a condition of contract subject to one hundred per cent *(100%)* replacement by suitable redesigned units.

Failure due to poor workmanship, while not necessarily indicating poor design will be considered in the same category as failure due to poor design. Redesigned replacement which will assure proper operation of the equipment will be supplied promptly, transportation paid, to the Naval activity using such equipment, upon receipt of proper notice and without cost to the Government.

All such defective parts will be subject to ultimate return to the contractor. In view of the fact that normal activities of the Naval Service may result in the use of equipment in such remote portions of the world or under such conditions as to preclude the return of the defective item or unit price to replacement without jeopardizing the integrity of Naval communications, the exigencies of the Service, therefore, may necessitate expeditious repair of such item or unit in order to prevent extended interruption of communications. In such cases the return of a defective item or unit for examination by the contractor prior to replacement will not be required. The report of a responsible authority, including details of the conditions surrounding the failure will be acceptable for effective adjustment under the provisions of this contractual guarantee.

The above period of *ONE YEAR* will not include any portion of the time that the equipment fails to give satisfactory performance due to defective items and the necessity for replacement thereof. All replacement parts will be guaranteed to give *ONE YEAR* of satisfactory service.

Report of failure of any part of this antenna system during its service life, shall be made to the Bureau of Ships in accordance with current instructions.

GENERAL

The Type COA-66089 External Antenna System is a vertical antenna equipped with a ground plane. At its operating frequency, 72.5 megacycles, it acts as a quarter wave grounded antenna radiating a vertically polarized wave. The horizontal field strength pattern will be approximately circular.

It is designed to be portable or fixed and is provided with accessories so that it may be mounted on either a deck rail, a vertical mast or rail, a bulkhead, or a deck. Figures 1 to 4 inclusive illustrate the different mountings possible.

It is sufficiently rugged for use on all types of vessels, is designed to withstand shock due to gunfire, and is treated to give a maximum protection against corrosion under extreme conditions of humidity and salt spray encountered in the service.

List of Major Parts and Accessories

The Type COA-66089 External Antenna System is packed, three in a wooden case, suitable for export shipment, and contains the following items:

QUANTITY	DESCRIPTION
1	Antenna structure complete with 4 - 40" ground plane rods 4 - Ground plane clamps complete 16 - brass, flat head, phillips head screws
2	U Bolts each complete with 2 - nuts 2 - flat washers 2 - lockwashers
2	Channel Clamps
2	27 foot lengths of CASSF-50-1 Cable Each complete with 2-type CPH-49195 cable connectors 2-rubber gaskets
1	Splice connector, type CPH-49191
4	3" x 1/4" bolts and nuts
3	3/4" x 1/4" bolts, nuts, washers & lockwashers

QUANTITY	DESCRIPTION
1	Equipment Mounting Bracket Assembly (Bureau of Ships Dwg. RE 66F 389A) complete with 1 - type CPH-49194 connector 1 - 2½" wire lead 1 - lug with screw
2	Instruction Books

INSTALLATION INSTRUCTIONS

1. Unpacking

The antennas are disassembled at the factory for convenience in shipping. Three antennas, each individually and completely packed in a sturdy corrugated carton container, are packed in a single wooden box. The antennas are suitably protected from the effects of moisture and humidity in shipping by a waterproof wrapping.

To assemble, remove one carton from the wooden box and open. The antenna is disassembled for shipping as follows:

1 - Vertical radiator complete with base and large angle bracket

4 - Ground plane rods

2 - Reels of cable with connectors

1 - Package of accessories

2 - Instruction books

The antenna may be used in several different positions as shown in Figures 1 to 4 inclusive. It is suggested that the installation be made rigid before the ground plane rods are permanently affixed in order to facilitate handling. No additional material is required for any of the mounting positions shown.

2. Selection of Antenna Location

In planning an installation, it should be remembered that for good radio performance an antenna should be mounted as high and as much in the clear as possible. It should be as far away from large metal objects and arrays of wires as possible. Two twenty-seven foot lengths of antenna cable are supplied with a splice connector (CPH-49191) sufficient to permit a maximum separation of the antenna from the transmitter-receiver of fifty-four feet. It is not deemed advisable to use any additional lengths of cable to obtain a greater separation or to cut or shorten the cable, as the supplied lengths have been chosen to give optimum radiation. If additional lengths

of cable other than as supplied must be used, for minimum transmission line loss the total length of the transmission line should be an electrical length of an integral multiple of half wave lengths. For Navy Type CASSF-50-1 cable, a half wavelength at 72.5 megacycles is 4 feet 5½ inches. The weight of the antenna completely assembled is 15½ pounds.

3. Equipment Mounting Bracket Assembly for TBY Equipment

Where this antenna system is used in conjunction with Model TBY TBY-1 or TBY-2 equipment, the transmission line may be connected to the Navy Type 43007 transmitter-receiver unit of the equipment by means of the "Equipment Mounting Bracket Assembly" furnished with this kit. The bracket may be attached to the equipment by forcing the projections on the lower edge into the battery strap attachment lugs on the left hand side of unit, after first removing the two lower case securing screws. Replacing the case securing screws through the holes provided in the bracket will rigidly secure the bracket to the transmitter receiver unit. Battery straps need not be removed. The lead from the receptacle incorporated in the bracket may then be attached to the antenna post by means of the 1/4"-20 screw supplied for the purpose.

4. Adjustments

No adjustments are needed for proper operation. It is essential that the ground plane rods be used in all installations where the antenna is some distance above ground. Where the antenna is mounted atop a steel cabin or on an open steel deck, the ground plane rods are not necessary. The ground plane acts to provide low-angle radiation towards the horizon in the manner of a simple dipole or quarter-wave grounded antenna. This provides good radiating efficiency in the horizontal plane in all directions of azimuth. To avoid shadows or poor transmission and/or reception in some directions, installation of the antenna near large metal objects should be avoided.

5. General

The antenna is shipped from the factory with its surfaces properly painted so as to give a minimum of reflection. The antenna may be repainted as desired to fit in with the ship's camouflage. Care should be exercised not to paint the insulator located at the base of the antenna, as impaired efficiency may result.

TESTING

Electrical tests on the completely assembled and installed antenna should be made as follows using a continuity meter, ohmmeter or a bell and battery arrangement.

With the two reels of cable connected to the antenna base and connected together by means of the splice connector:

(1) Measure the resistance between the center contact and the shield of the connector (CPH-49195) which normally connects to the equipment. An open circuit (resistance at least 20 megohms) should be observed.

(2) After this measurement, short-circuit this same end of the cable with a set of clip leads or a piece of wire and with a pair of sharp test prongs, measure the resistance between the vertical radiator and the ground plane rods. This should show a very low resistance with each of the ground plane rods. It will be necessary in making this test to make certain that the test prongs penetrate the paint on the antenna rods. It may be necessary to scratch away a little of the paint to secure good contact.

MAINTENANCE

There are no special maintenance requirements for this antenna. Periodical visual examination should be made to observe whether the insulator at the base has any cracks, and if cracked, whether water has entered the base housing causing the vertical radiator to ground. The insulator material has been specially chosen to give little trouble in this respect. However, should a crack develop, a new insulator will be supplied by the contractor under the guarantee terms of this contract or upon requisition. "Acraloid", a cement manufactured by the Rohm & Haas Company of Philadelphia, Pennsylvania should be used to seal the vertical radiator in the insulator. This will also be supplied as above.

The insulator is replaced by removing the screws from the base plate holding the base housing, unsoldering the lead to the antenna rod and removing it with a socket wrench.

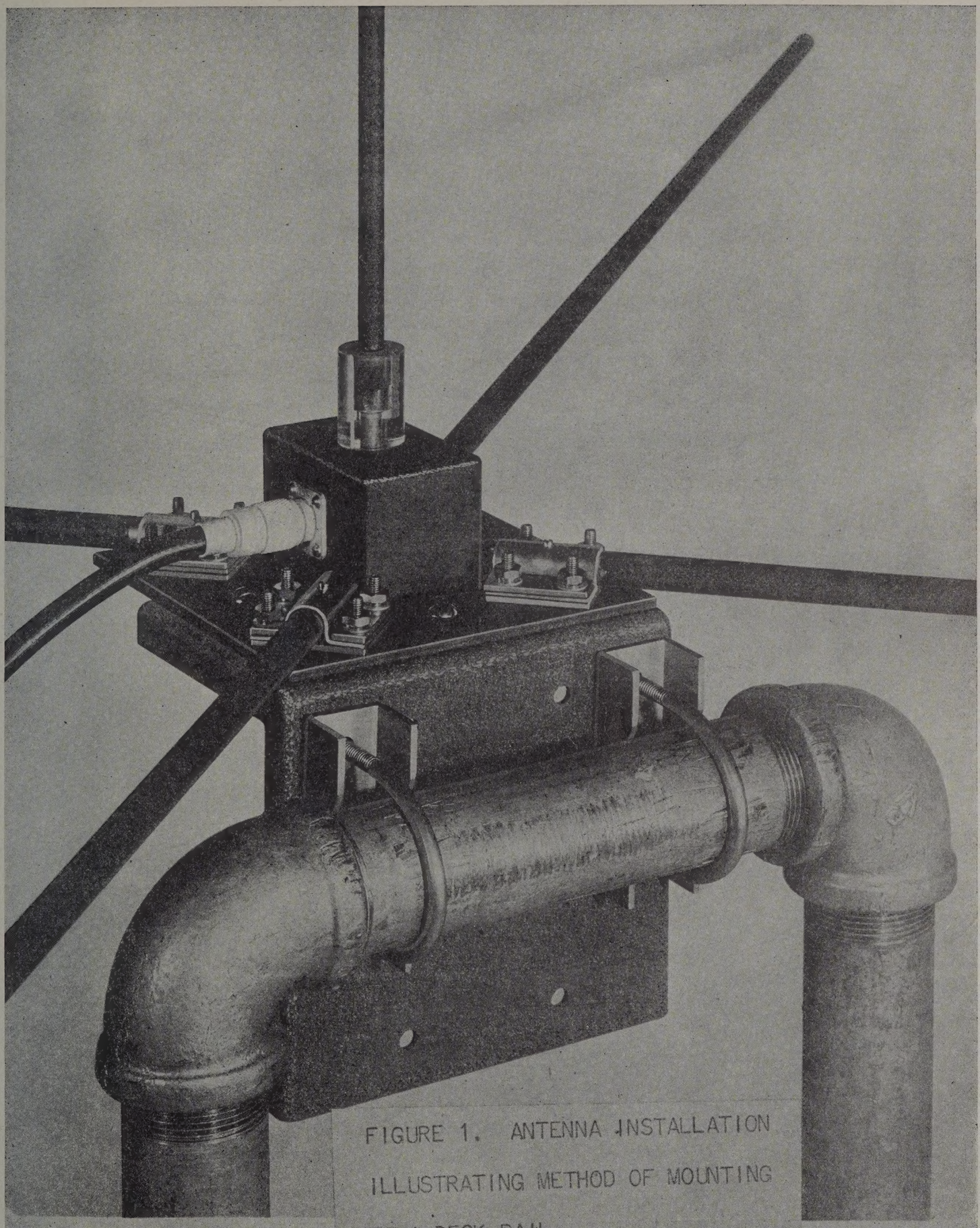


FIGURE 1. ANTENNA INSTALLATION ILLUSTRATING METHOD OF MOUNTING TO A DECK RAIL

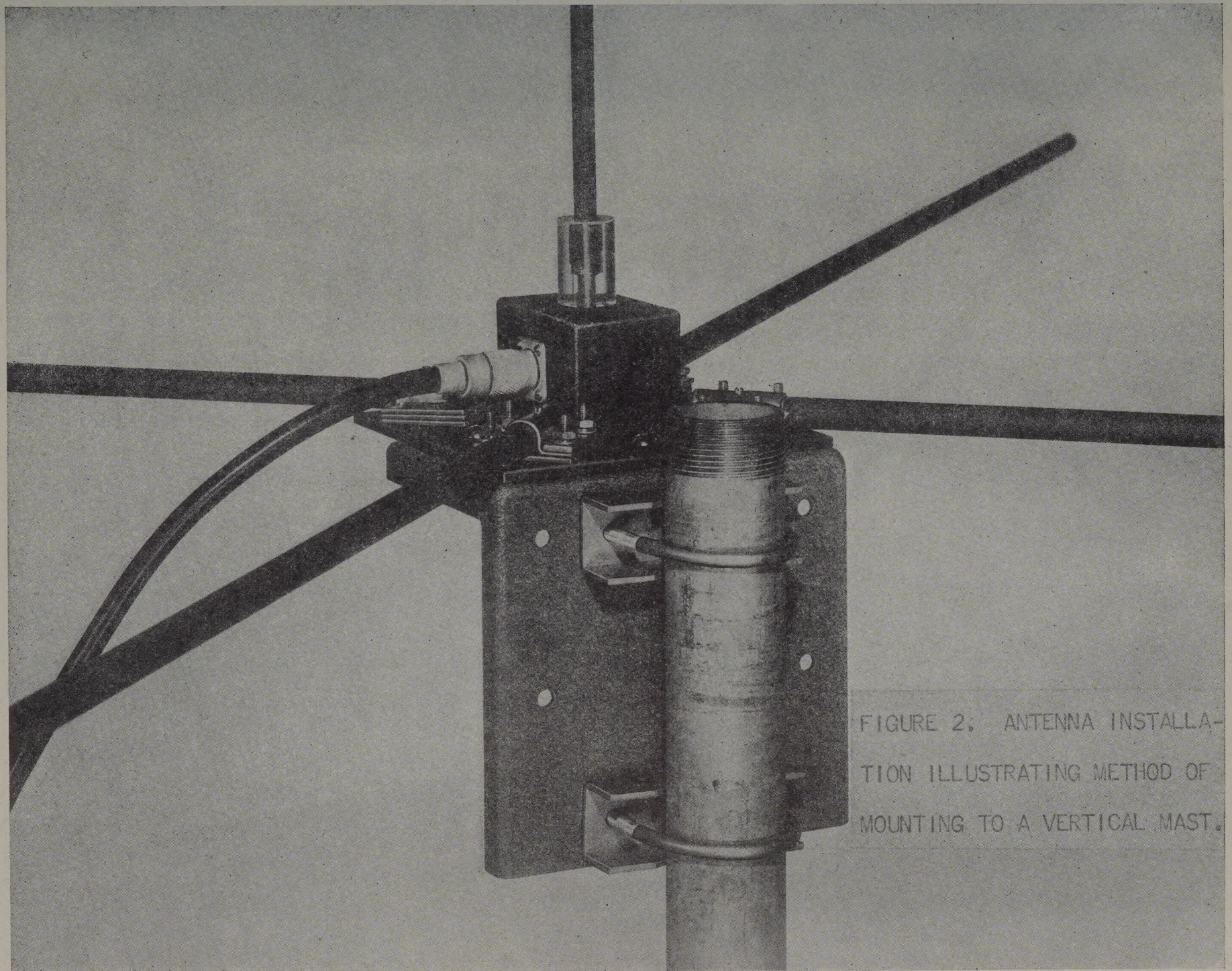


FIGURE 2. ANTENNA INSTALLATION ILLUSTRATING METHOD OF MOUNTING TO A VERTICAL MAST.

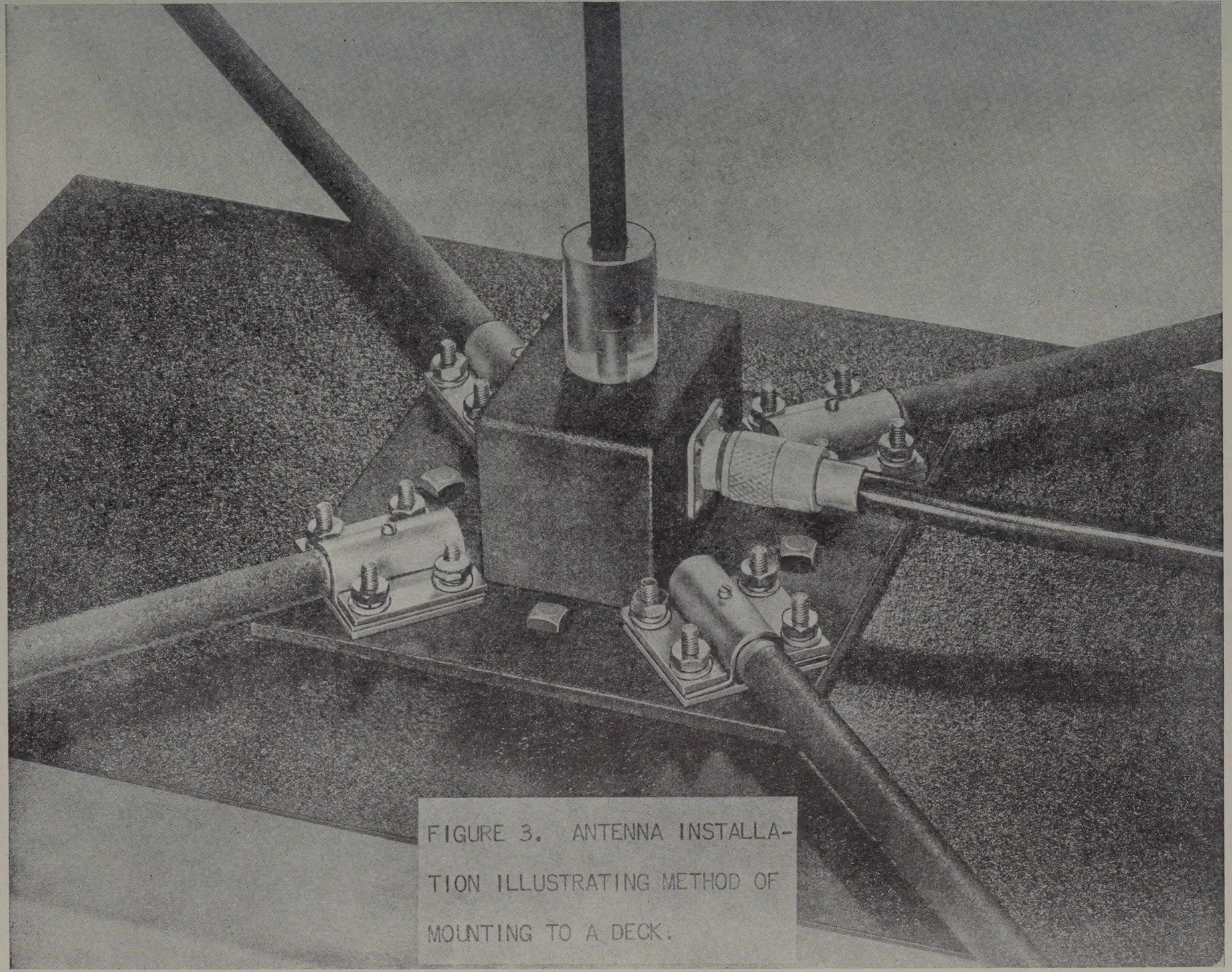


FIGURE 3. ANTENNA INSTALLATION ILLUSTRATING METHOD OF MOUNTING TO A DECK.

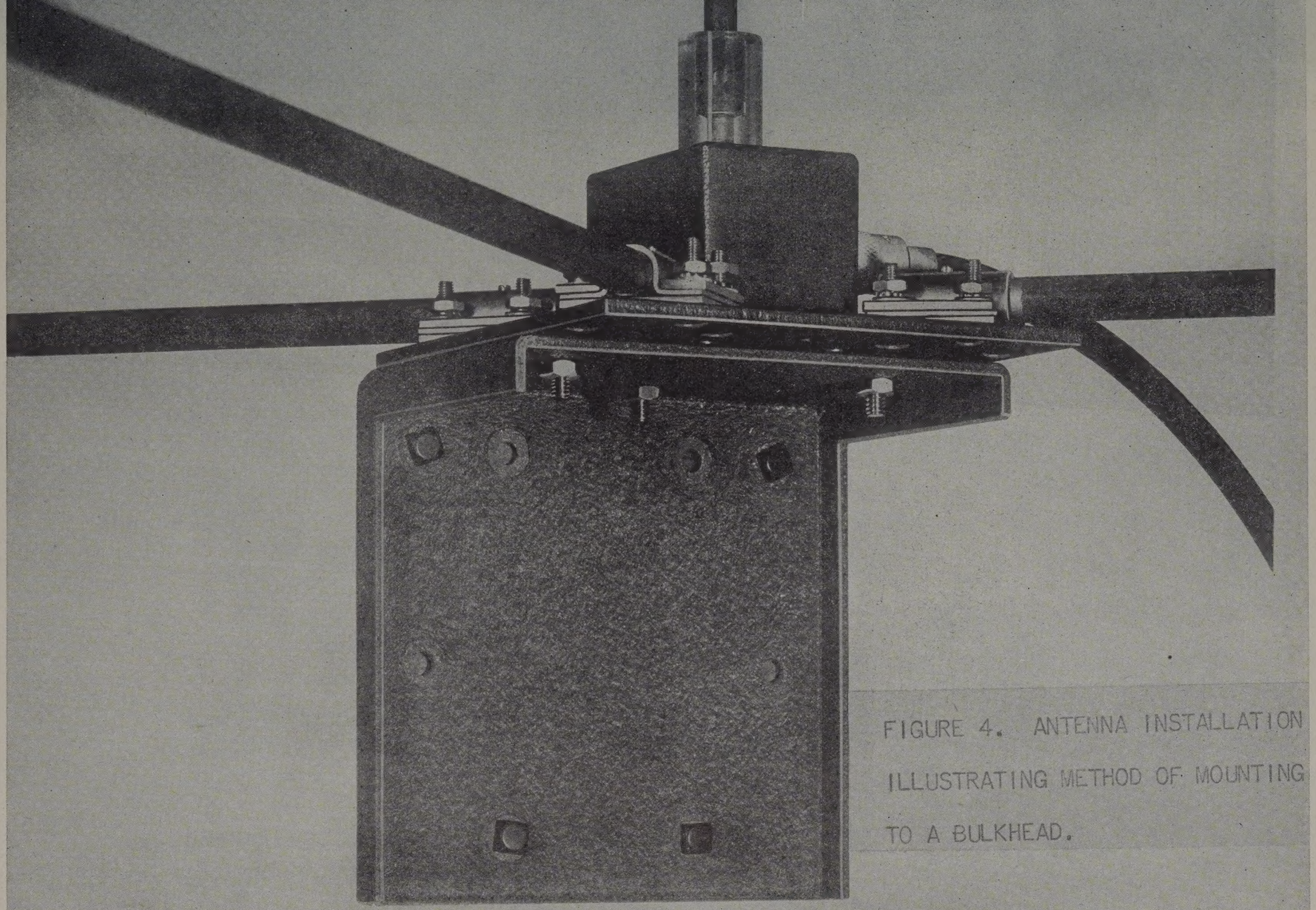


FIGURE 4. ANTENNA INSTALLATION ILLUSTRATING METHOD OF MOUNTING TO A BULKHEAD.

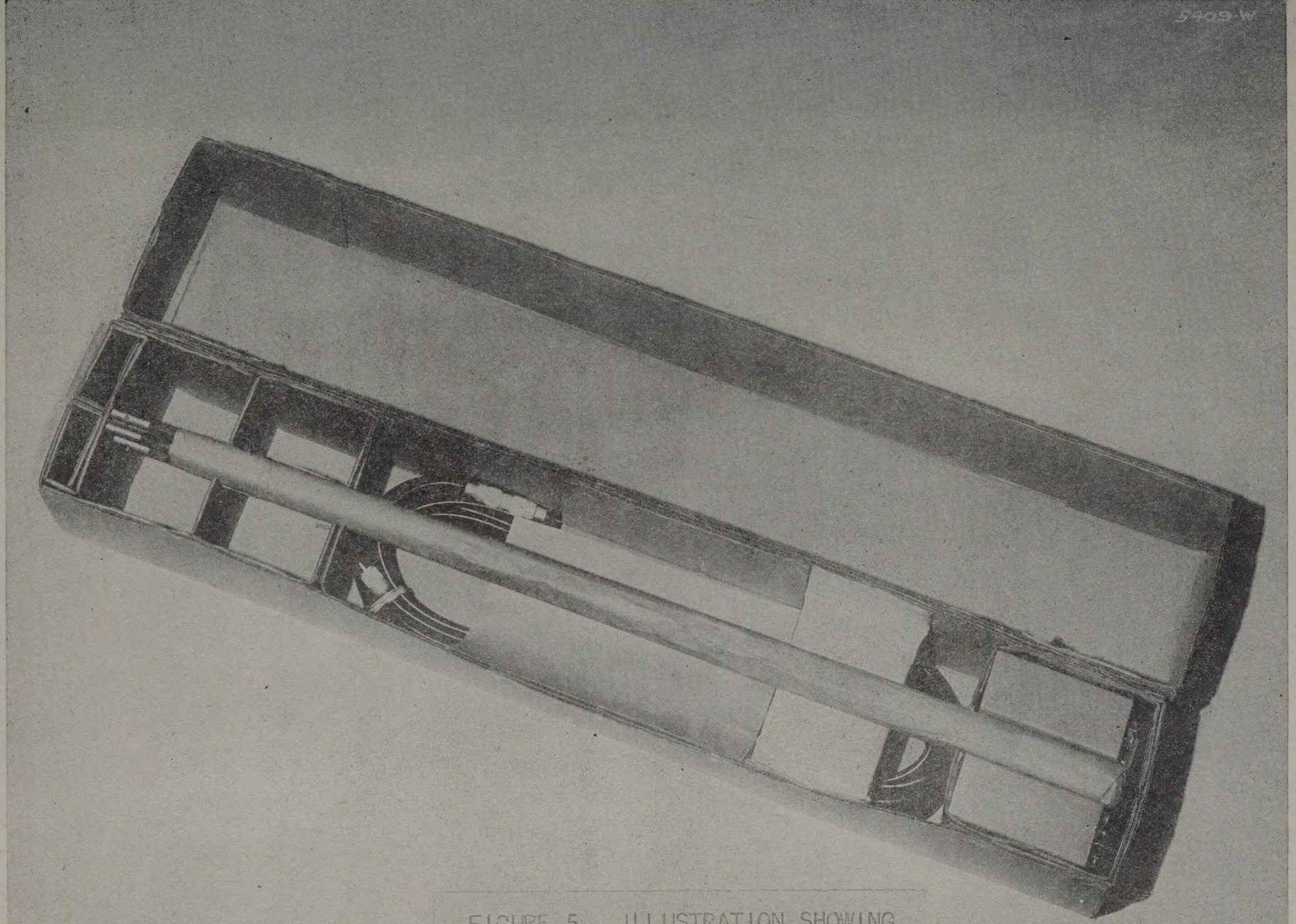


FIGURE 5. ILLUSTRATION SHOWING METHOD OF SHIPMENT AND PACKING.

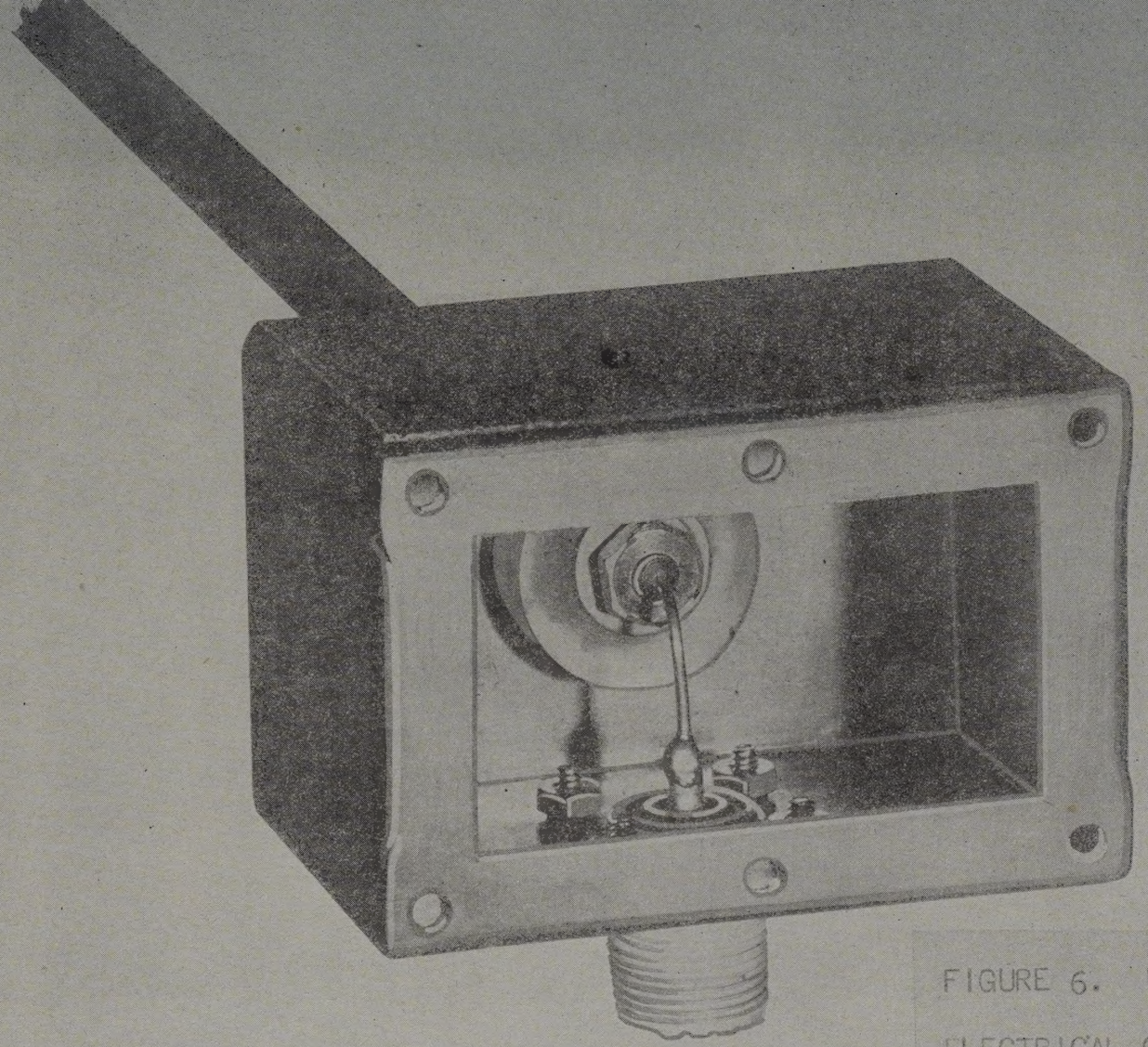


FIGURE 6. ILLUSTRATION SHOWING ELECTRICAL CONNECTION TO VERTICAL RADIATOR IN ANTENNA HOUSING.

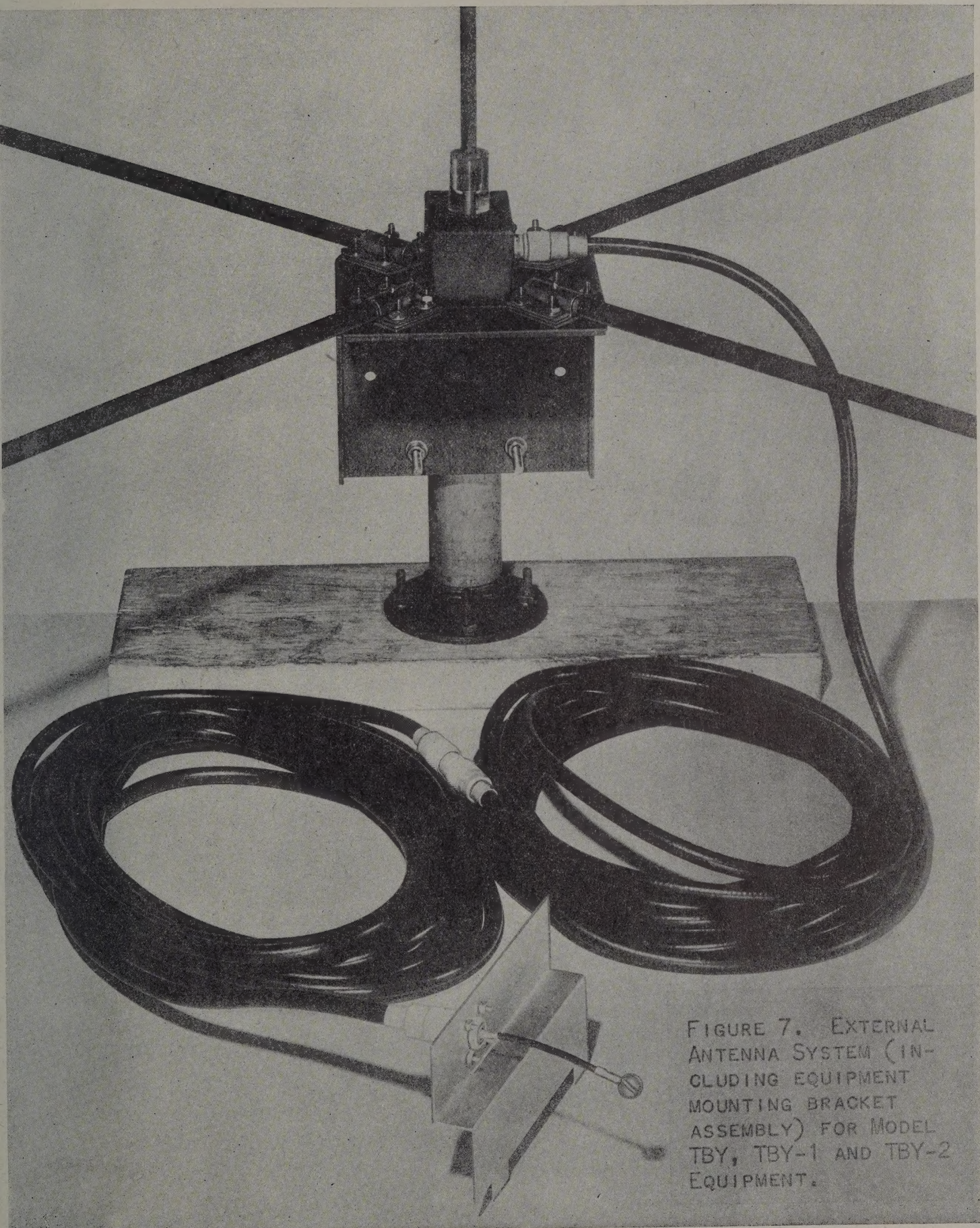
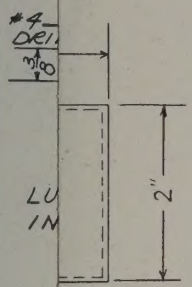


FIGURE 7. EXTERNAL ANTENNA SYSTEM (INCLUDING EQUIPMENT MOUNTING BRACKET ASSEMBLY) FOR MODEL TBY, TBY-1 AND TBY-2 EQUIPMENT.



SYMBOL	QUANTITY	DESCRIPTION	MATERIAL	REFERENCE
1	1	ANTENNA	BRASS 3/8 OD NICKEL PLATED	
2	1	LUCITE INSULATOR	LUCITE	
3	8	4/40 NUT	BRASS NICKEL PLATE	
4	1	BOX	14 GAUGE C.R. STEEL CADMIUM PLATE	
5	8	#4 LOCK WASHER	BRONZE NICKEL PLATE	
6	8	4/40 x 3/8 SCREW	BRASS NICKEL PLATE	
7	10	1/2 x 1/16 WASHER #10	BRASS NICKEL PLATE	
8	17	#10 LOCK WASHER	BRONZE NICKEL PLATE	
9	17	10/32 x 3/8 HEX NUTS	BRASS NICKEL PLATE	
10	16	10/32x7/8 PHILLIPS SCS.	BRASS NICKEL PLATE	
11	1	1" LONG #16 WIRE	COPPER TINNED	
12	2	RECEPTACLE ASSEMBLY		NT49194
13	16	3/8 x .040 WASHER #10	BRASS ZINC PLATE	
14	3	1/4-20 x 3/4 BOLT	BRASS NICKEL PLATE	
15	7	1/4 x 1/16 x 1/2 WASHER	BRASS ZINC PLATE	
16	7	1/4-20 x 7/16 HEX NUT	BRASS NICKEL PLATE	
17	7	1/4 LOCK WASHER	BRONZE NICKEL PLATE	

SYMBOL	QUANTITY	DESCRIPTION	MATERIAL	REFERENCE
1	1	ANTENNA	BRASS 3/8 OD NICKEL PLATED	
2	1	LUCITE INSULATOR	LUCITE	
3	8	4/40 NUT	BRASS NICKEL PLATE	
4	1	BOX	14 GAUGE C.R. STEEL CADMIUM PLATE	
5	8	#4 LOCK WASHER	BRONZE NICKEL PLATE	
6	8	4/40 x 3/8 SCREW	BRASS NICKEL PLATE	
7	10	1/2 x 1/16 WASHER #10	BRASS NICKEL PLATE	
8	17	#10 LOCK WASHER	BRONZE NICKEL PLATE	
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14	3	1/4-20 x 3/4 BOLT	BRASS NICKEL PLATE	
15	7	1/4 x 1/16 x 1/2 WASHER	BRASS ZINC PLATE	
16	7	1/4-20 x 7/16 HEX NUT	BRASS NICKEL PLATE	
17	7	1/4 LOCK WASHER	BRONZE NICKEL PLATE	
18	4	PLUG ASSEMBLY		NT49195
19	2	27 FT. LENGTHS		CASSF-50-1
20	2	CHANNEL CLAMP	C.R. STEEL CADMIUM PLATE	
21	4	GROUND PLANE RODS	1/2" OD BRASS CADMIUM PLATE	
22	2	U - BOLT	EVERDUR NICKEL PLATE	
23	1	WASHER	LUCITE	
26	1	ANGLE	1/8" C.R. STEEL CADMIUM PLATE	
28	4	GROUND PLANE ROD CLAMP	BRASS NICKEL PLATE	
29	4	GROUND PLANE ROD STRIP	C.R. STEEL CADMIUM PLATE	
30	4	GROUND PLANE ROD PLATE	BRASS NICKEL PLATE	
31	1	ANTENNA PLATE	C.R. STEEL CADMIUM PLATE	
32	1	EQUIPMENT BRACKET	C.R. STEEL CADMIUM PLATE	
33	1	1/4-20x3/8 FILISTER HD.	BRASS ZINC PLATE	
34	1	1/4 LUG	COPPER TINNED	
35	1	#14 STRANDED WIRE	COPPER TINNED	
36	1	GASKET APPROX. .025 THICK	NEOPRENE	
37	1	GASKET APPROX. .025 THICK	NEOPRENE	
38	1	SPLICE FITTING		NT49191
39	4	1/4-20 x 7/16 HEX NUT	STEEL CADMIUM PLATED	
40	4	1/4-20 x 3" BOLT	STEEL CADMIUM PLATED	

EXTERNAL ANTENNA SYSTEM
TYPE CDA-66089 OPERATING FREQUENCY 72.5 ± 1 MC
(INCLUDING EQUIPMENT MOUNTING BRACKET ASSEMBLY) FOR
MODEL TBY, TBY-1 AND TBY-2 EQUIPMENT

MANUFACTURED FOR

U.S. NAVY DEPARTMENT BUREAU OF SHIPS

BY

ABBOTT INSTRUMENT, INC.
NEW YORK, N. Y.

CONTRACT NXss 27168 OR NXsr 33385 — DATE APRIL 22, 1943 OR JUNE 29, 1943

ALL PARTS EXCEPT CHANNEL CLAMPS U BOLTS
GROUND PLANE CLAMPS AND HARDWARE FINISHED
IN ZINC CHROMATE PRIMER AND OD WRINKLE

DRAWN BY L.M.Mc.

CHECKED BY J.H.Banach